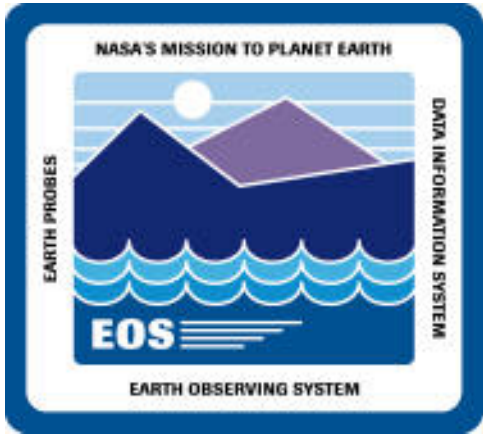

Storage Management Detail Design

Don Brown

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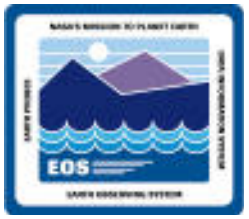
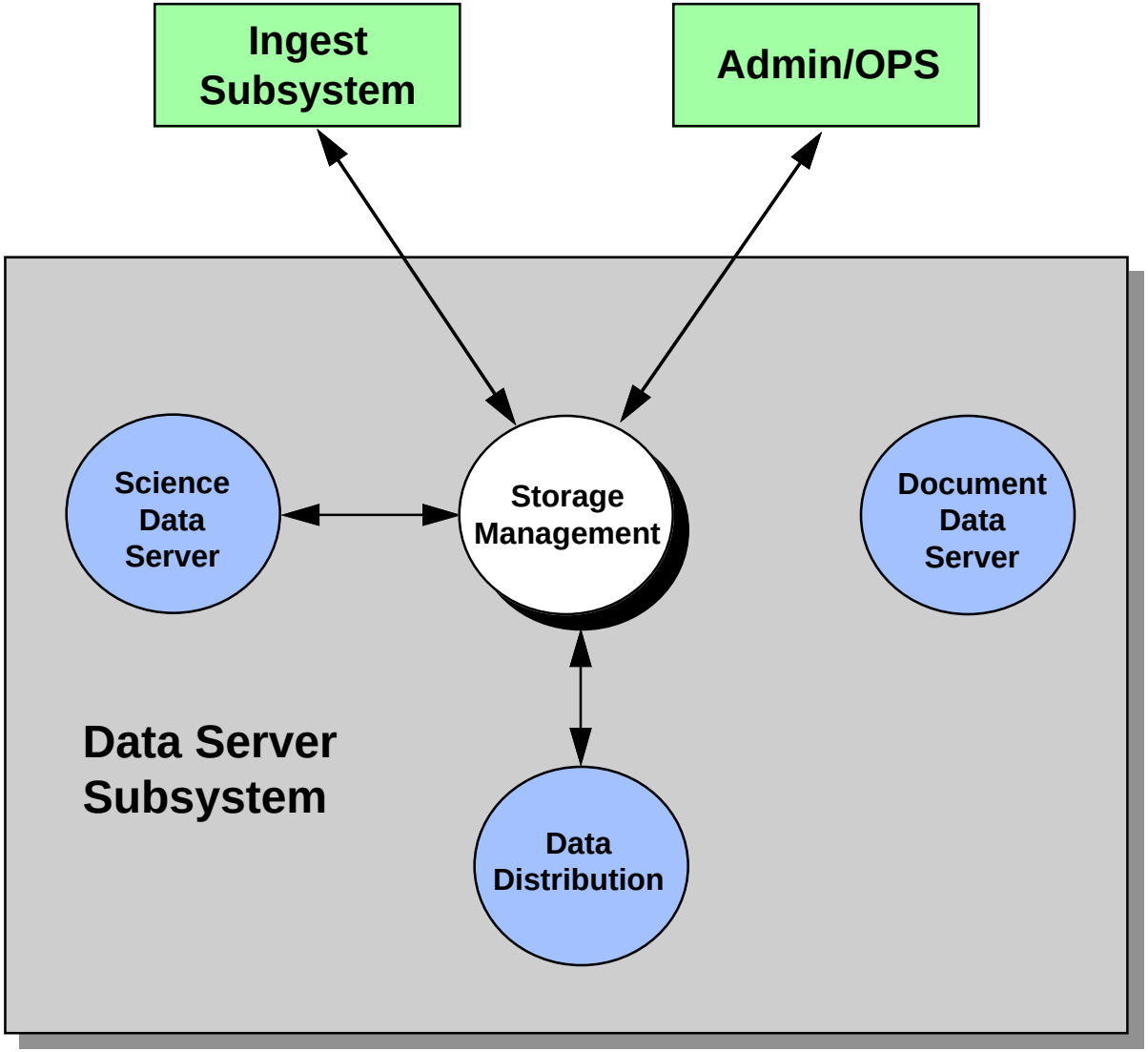
17 April 1996

Storage Management Agenda

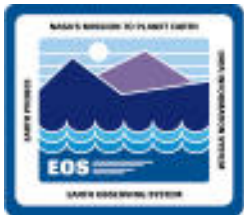


- **Context**
- **Release B Capabilities**
- **COTS Selections**
- **High Level Physical Design**
- **Status**
- **Detail Design**

Context


Ingest Subsystem
Admin/OPS
Science Data Server
Storage Management
Document Data Server
Data Server Subsystem
Data Distribution

Storage Management Agenda



- Context
- **Release B Capabilities**
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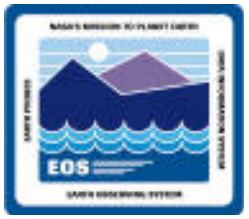
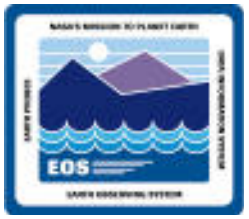
- Detail Design

Release B Capabilities



- All current Release A functionality
- Backup and restore archived data for local and offsite purposes
- Collect performance data and provide performance reports for DSS hardware
- Estimate costs for provided services
- Collect and report Accounting Management data
- Delete files from the ECS Archive
- Monitor and report checksum errors
- Estimate time to retrieve files from the archive
- Display storage system operating parameters contained in configuration files
- Notify operations personnel when necessary to request the reingest of EDOS data

Storage Management Agenda



- Context
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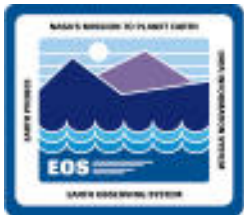
COTS Selections



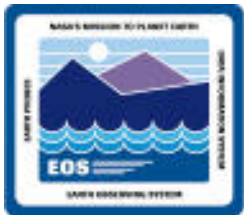
FSMS

- **AMASS continues to be the COTS product**

DBMS

- **Added to Release A post IDR-B**
  - **Used to monitor pull storage area**
  - **Sybase chosen to conform with project baseline**
- **Sybase continues to be used in Release B**

Storage Management Agenda



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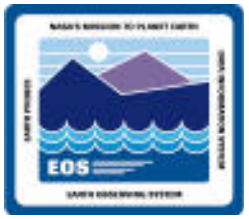
Processes



Determined by Functionality

2 Resource Monitors
- **Monitors Pull Staging Area**
- **Monitors Staging Cache Area**

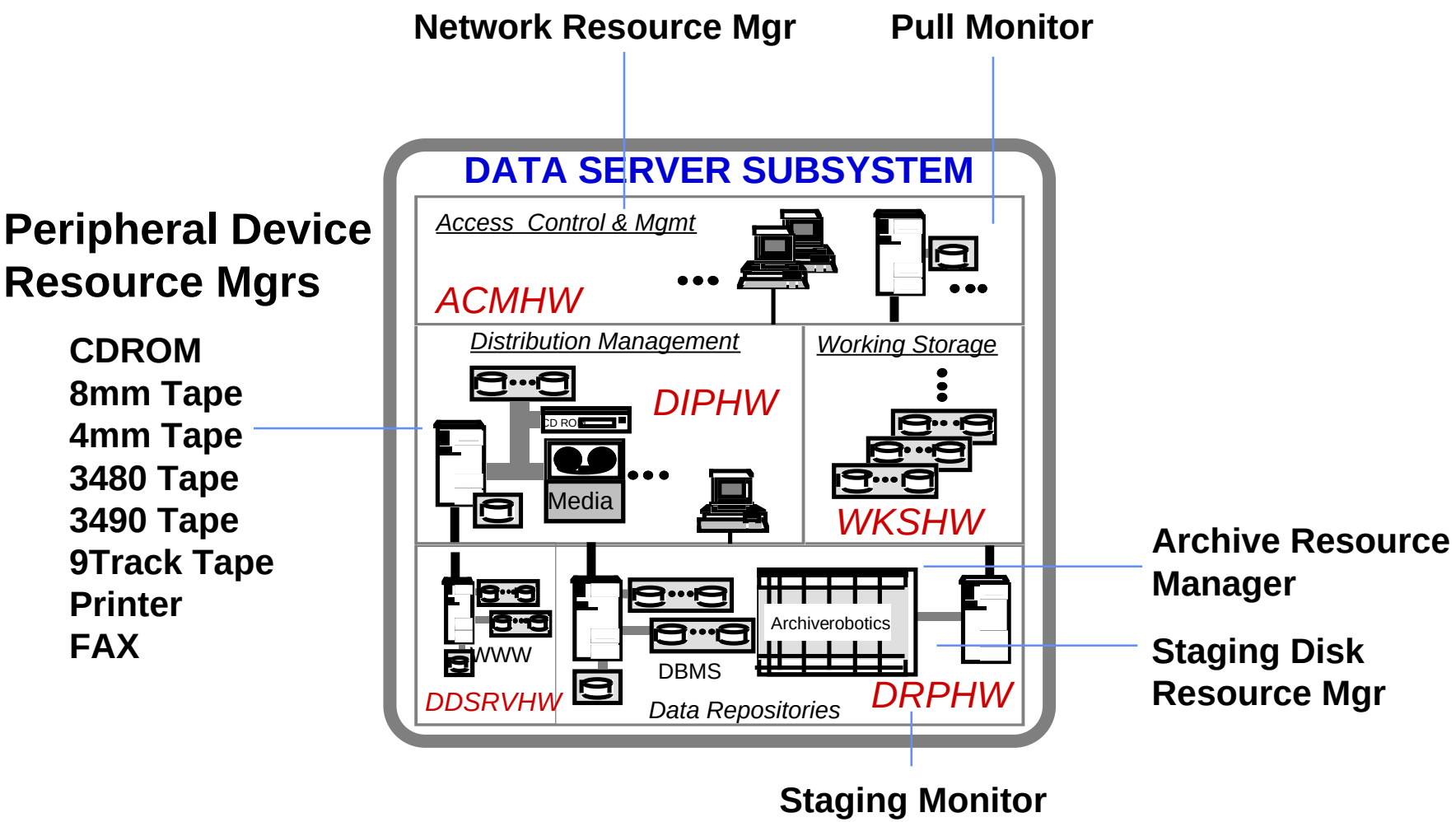
8 Peripheral Managers
- **One for Each Peripheral Type**

1 Archive Manager
- **Interfaces with FSMS COTS**

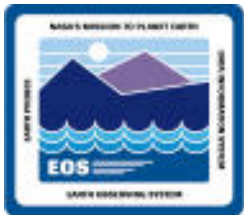
1 Staging Manager
- **Manages Working Storage**

1 Network Manager
- **Manages Network Resources**

Physical Design



Storage Management Agenda



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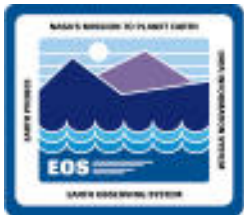
Status

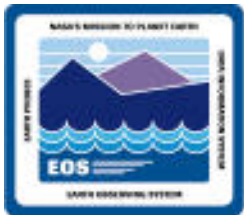


Design Updates

Action Item Resolution

- RID #5 Meeting Action Items
- Operations Workshop
- IDR-B
- Detail Design Inspection

Updates and Enhancements Since IDR Design



Archive Data Backup and Restore

Resource Cost Estimation

File Retrieval Time Estimation

RID #5 Meeting Action Items

ACTION ITEM	DESCRIPTION	COMMENTS
1	Request for information about error handling and fault management for distribution errors	STMGT implements error handling and fault management as defined by the infrastructure group. Details will be discussed at the detailed design presentation
2	Is there a single tape manager for all types? Request for scenario to cover aspects of document delivery.	No, there is not a single tape manager. There is a manager for each resource pool. Currently, we have the following: 8MM, 4MM, 9-track, 3490, and 3480.
9	Whether standing orders are filled from storage disks without having to restage before putting on the pull area	Subscriptions will be fulfilled from staging disks. While fulfilling the subscription without staging the data is possible, this occurrence is not guaranteed.
13	Discuss issues such as multiple “hops” at CDR. How will technology improve? Discuss alternatives, storage strategies.	The current design does not have additional “hops”. Data is moved directly from the working storage to the distribution service.
15	Request that stackers be incorporated into the design for STMGT	There is a scenario that has been added to DID 604 (Ops Concept for Release B). This scenario describes how we would use an 8MM stacker for distribution requests.
21	Want to see the design of an integrated view of statistical monitoring. E.g., a single place to look at the monitoring from AMASS as well as the checksums.	STMGT Release B design supports the idea of an integrated view of statistical monitoring. A scenario entitled “Monitor Checksum Errors” is included in DID 305 Section 6.4.4-24. Another scenario entitled “Archive_Retrieve_Checksum_Error is included.
30	Present what is involved in backup. This should be done cooperatively with the instrument teams.	The design for archive data backup and restore is depicted in DID 305 Section 6. The topic will be discussed during the “Featured Topics” presentation at CDR and discussed during the detailed design of STMGT.

RID #5 Meeting Action Items (cont.)

ACTION ITEM	DESCRIPTION	COMMENTS
31	What will be the plan for the backup of non-science data? (A system-level question)	Non-archive data backup and restoration is not an STMGT issue; however, the system backup will be accomplished using Legato Networker.
34	It sounds like ECS may not be allocating time to have someone perform the function of general consistency checks	ESDIS will provide clarification so that ECS can investigate the issue.

Ops Workshop Action Items

ACTION ITEM	DESCRIPTION	STATUS
58	QA of written media	QA is performed in the device. The device is configured to read-after-write. Media errors are tracked and will be used to request a new media if the error threshold is reached.
59	Bar Code Action/Issues/Concerns	Discussed during the 4/5/96 DSS Detailed Design Meetings. Bar Code Reader impact will be assessed and is only a convenience to the distribution technician as a result of tape stackers. Determination of cost impact will have to be made.
87	How do you re-invoke Push once the problem is sorted out?	STMGT provides notification to IDG of a failure. Re-invoke of Push is an IDG function.
103	Add to 605 a scenario where a distribution order runs into an archive failure	DID 305 contains the backup/restore design. Local backup media is always available or the data can be recreated if the information is contained on the production history. Refer DID 605 scenario creation to M&O.

IDR-B Issues

ISSUE	DESCRIPTION	STATUS
41	Expect to see EXACT design goals for backup at CDR	Backup DIT formed to resolve the issue. Backup Paper delivered to the Government. DSS documented the Backup/ Restore design in DID 305. CDR discussion will occur during the detailed design walkthrough of STMGT.
44	Involve design telecon in the archive backup trade study	Backup DIT formed to resolve the issue. Backup Paper delivered to the Government. DSS documented the Backup/ Restore design in DID 305. CDR discussion will occur during the detailed design walkthrough of STMGT.

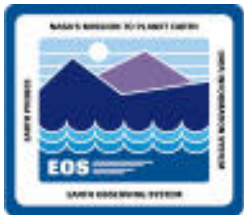
IDR-B Promises

ITEM	DESCRIPTION	STATUS
13	Determine Data to be Backed Up and Volume of Data	Issue addressed at the Backup DIT
13	Select Safe Store DAAC Locations	Issue addressed at the Backup DIT
13	Decide Upon Mechanism for DAAC to DAAC Data Transfer	DSS referred the issue to DE because the resolution involved multiple ECS subsystems

Detail Design Inspection

ACTION ITEM	DESCRIPTION	STATUS
1	Re-evaluate requirement DSS-20720 in light of current system architecture	Closed
2	Identify public and private methods and attributes as such in object models	Closed
3	Change occurrences of String to RTWCString, and all occurrences of char* to the appropriate Ex standard type	Closed
4	Review attributes on object models and ensure that ECS Standard naming conventions are followed	Closed
5	Determine how STMGT knows to bakup a file on store request	Closed
6	Determine how the DsStResourecManager knows what to back up	Closed
7	Show GUI initiation of a backup or restore request on event traces	Closed
8	Add text associated with object models in 305 document	Closed
9	Determine if PDL is required to conform to PI	Closed

Storage Management Agenda



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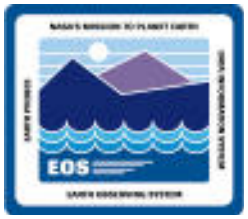
Detailed Design

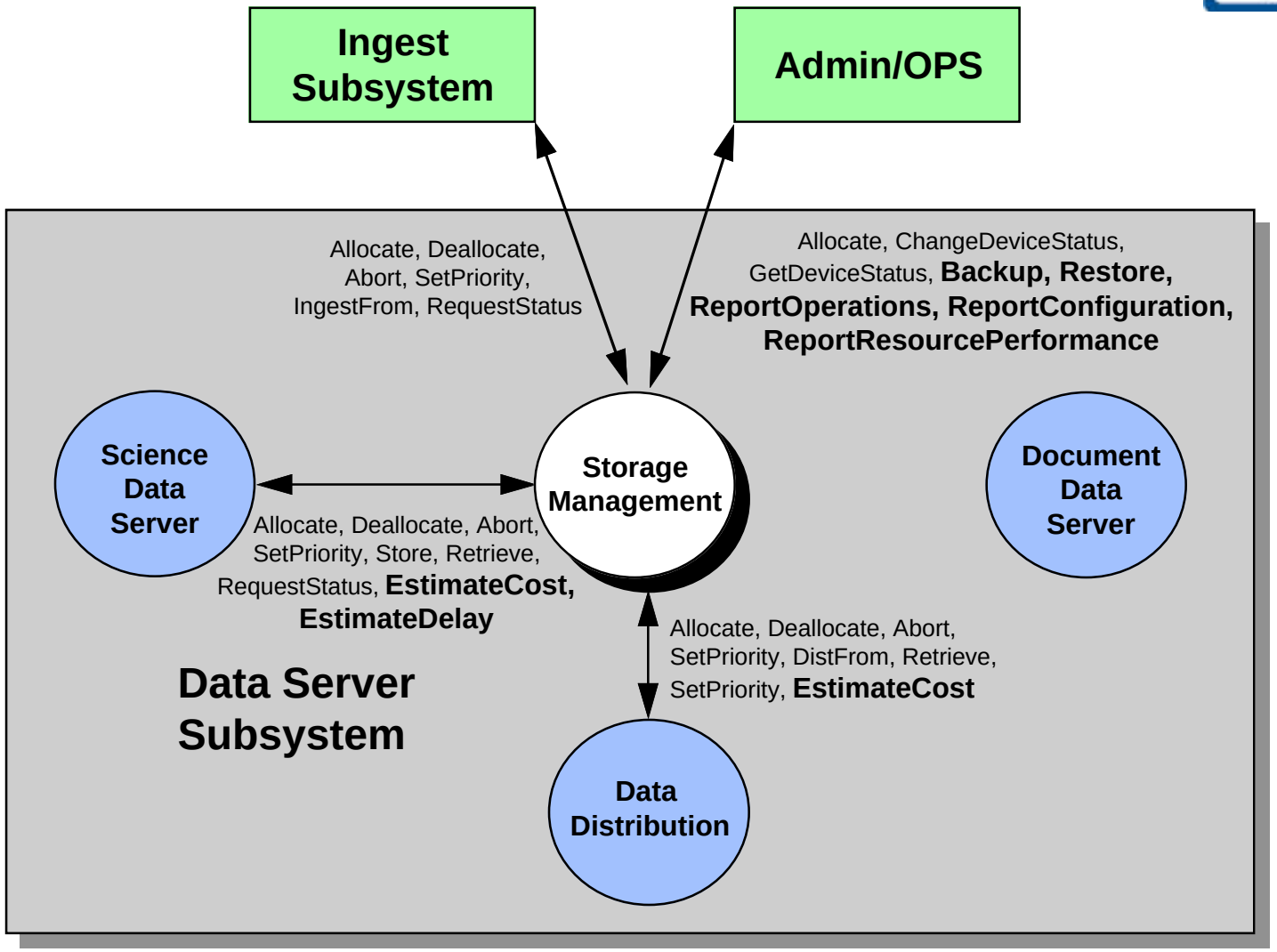


Context

Object Models

Dynamic Models

Context


Ingest Subsystem
Admin/OPS
Allocate, Deallocate, Abort, SetPriority, IngestFrom, RequestStatus
Allocate, ChangeDeviceStatus, GetDeviceStatus, Backup, Restore, ReportOperations, ReportConfiguration, ReportResourcePerformance
Science Data Server
Storage Management
Document Data Server
Allocate, Deallocate, Abort, SetPriority, Store, Retrieve, RequestStatus, EstimateCost, EstimateDelay
Allocate, Deallocate, Abort, SetPriority, DistFrom, Retrieve, SetPriority, EstimateCost
Data Server Subsystem
Data Distribution

Object Models

The following object models in Document 305-CD-024-002 Section 6 will be reviewed:

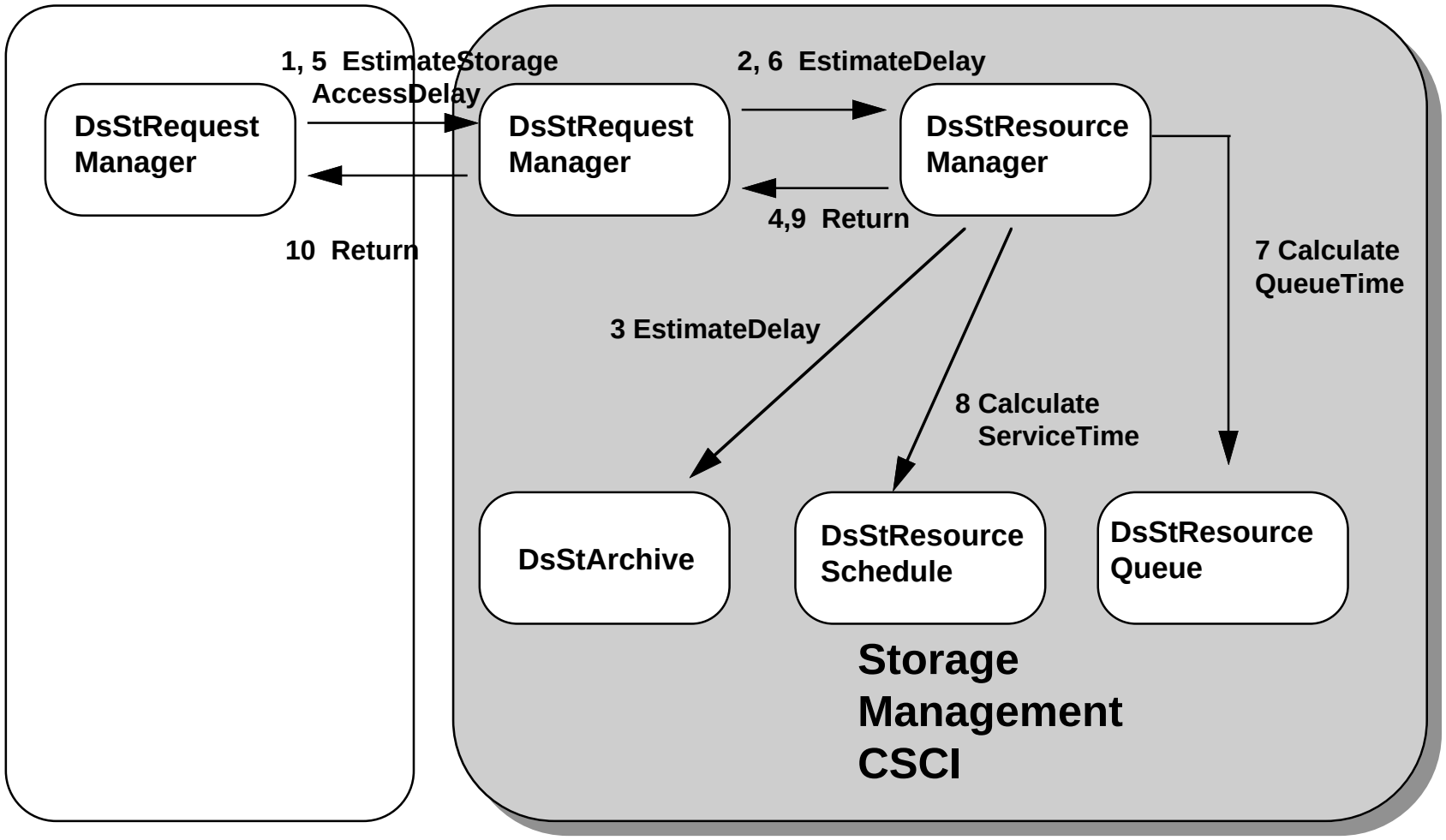
Model Name	Figure
Configuration Reporting	6.3-1
Resource Costing	6.3-2
Data Storage	6.3-3
Monitoring Disk	6.3-4
File Access	6.3-5
Backup/Restore	6.3-6
Peripherals	6.3-7
Resource Management	6.3-8

Dynamic Models

The following event traces in Document 305-CD-024-002 Section 6 will be reviewed:

Event Trace Name	Diagram Name	Document Figure
Initiating File Backup	Backup_Archive_Data	6.4.20-1
Local File Backup	Creating_Local Backup	6.4.9-1
Offsite File Backup	Creating_Offsite_Backup	6.4.10-1
Local File Restore	Restoring_Local_Backup	6.4.17-1
Local Restore Failure	Failure_Restoring_Local_Backup	6.4.15-1
Time Estimation	Estimate_Time_Delay	6.4.23-1
Cost Estimation	Estimate_Storage_Allocation_Cost	6.4.22-1
Service Rejection	Rejecting_Service_Insufficient_Funds	6.4.16-1
Checksum Errors	Monitor_CHECKSUM_Errors	6.4.24-1

Estimate Time Delay



Ref. DID 305 Section 6.4-23 "Estimate_Time_Delay"